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Current claims of the International Patent Application PCT/EP2004/014179

1. A clamping and/or spreading tool comprising a drive for displacement of a push or pull rod to which a movable jaw is fixed with respect to a support carrying a stationary jaw in longitudinal direction of the push and pull rod, said drive comprising a torsion spring and a drive wheel being coupled to the torsion spring and being adapted to enter torque transmitting engagement with the push or pull rod for displacement of the same.

2. A clamping and/or spreading tool according to claim 1, wherein said drive wheel contacts said pull or push rod for engagement in friction or force lock, wherein preferably the drive wheel rolls off said push or pull rod, particularly such that a rotatory motion of said drive wheel is converted in a translatory motion for the push or pull rod.

3. A clamping and/or spreading tool according to claim 1 or 2, wherein said drive wheel comprises a rotational axis which is coincident with a rotational axis of said torsion spring.

4. A clamping and/or spreading tool according to one of the claims 1 to 3, comprising a mechanism for changing the direction of displacement of said pull or push rod from a closing direction, in particular for applying clamping or spreading forces, in an opening direction or vice versa.

5. A clamping and/or spreading tool according to claim 4, characterized in that said mechanism comprises a rotation alternator designed to invert torque transmetted to said pull or push rod by the drive wheel.

6. A clamping and/or spreading tool according to one of the claims 1 to 5, characterized in that a gear component for converting a rotatory motion into a translatory motion is arranged between said drive wheel and said pull or push rod, wherein particularly said gear component is adapted for an engagement with said drive wheel, in which torque is transmittable, and for being engaged by the same, and/or in particular is movably supported such that it can be moved between an active position for converting

a rotatory motion of said drive wheel into a translatory motion of said pull or push rod and a passive position without conversion of rotatory motion.

7. A clamping and/or spreading tool according to claim 6, characterized in that said mechanism for reversing the direction of displacement comprises an intermediate gear member which is adapted to be coupled operationally with the drive wheel and the gear component, wherein in particular with a first gearing configuration for a first direction of displacement the drive wheel drives the gear component via said intermediate gear member and with a second gearing configuration for a second direction of displacement opposite to the first direction of displacement said drive wheel drives directly said gear component.

8. A clamping and/or spreading tool according to claim 7, characterized in that said intermediate gear member is adapted to enter into a form or force lock engagement with said drive wheel and/or said gear component, especially in a frictional contact or a meshing teeth contact.

9. A clamping and/or spreading tool according to one of the claims 4 to 8, characterized in that said mechanism comprises a switch means for selecting the direction of displacement.

10. A clamping and/or spreading tool according to claim 9, characterized in that the switching means comprises an operating member that activates and/or deactivates a rotation alternator.

11. A clamping and/or spreading tool according to claim 10, characterized in that said operating member comprises a lock blocking the displacement of said push or pull rod in a closing direction, in particular for keeping clamping and/or spreading forces between said jaws.

12. Clamping and/or spreading tool according to claim 10 or 11, characterized in that said operating member has an especially un-actuated blocking position to prevent a displacement of the push or pull rod in a closing and/or opening direction, a first release

position to prevent rotatory motion in a first direction of displacement and a second release position to permit rotatory motion for a second direction of displacement.

13. A clamping and/or spreading tool according to claim 12, characterized in that in a release position of said operating member an adjusting member adjusts said gear component or said intermediate gear member, in particular moves the gear component into a form or force lock engagement with said drive wheel.

14. A clamping and/or spreading tool, in particular according to one of the claims 1 to 13, having a drive for a continuous displacement of a push or pull rod to which a movable jaw is fixed with respect to a support carrying a stationary jaw of the clamping and/or spreading tool in longitudinal direction of the push and pull rod, and an activating means upon operation of which said drive displaces said push or pull rod, characterized in that the drive comprises a means for generating a pull between said push or pull rod and said support.

15. A clamping and/or spreading tool according to claim 14, characterized by a tension spring, in particular a torsion spring, the tension spring being fixed on the one hand on said support and on the other hand on said push or pull rod or on said movable jaw.

16. A clamping and/or spreading tool according to claim 14 or 15, characterized in that a point of application of force of said tension spring on said push or pull rod is detachable and the point of application of force can be shifted along said push or pull rod.

17. A clamping and/or spreading tool according to one of the claims 14 to 16, characterized in that said means for generating a pull is coupled to a windable force transmitting member, wherein in particular said windable force transmitting member comprises a coil carrier which is coupled to said means for generating a pull so as to transmit torque and in particular is supported stationarily on the support.

18. A clamping and/or spreading tool according to on of the claims 14 to 17, characterized in that said means for generating a pull is a coiled spiral band spring which in particular comprises a spiral band carrier rotatably supported on said support.

19. A clamping and/or spreading tool according to one of the claims 14 to 18, characterized in that said means for generating a pull, in particular an unwound band section of a spiral band spring, is at least partly positioned in a seat or a groove of said push or pull rod particularly formed as an I-beam.

20. A clamping and/or spreading tool, in particular according to one of the claims 1 to 19 comprising a drive for displacement of a push or pull rod in a longitudinal direction, said push or pull rod being movably supported on a support of the clamping and/or spreading tool to which push or pull rod a movable jaw is fixed with respect to said support carrying a stationary jaw, said drive having a prime mover, as a torsion spring, a spiral band spring or the like, and providing a drive force, characterized in that a damping means is adjusted to said prime mover of said drive, in particular for providing a uniform displacement rate along the entire displacement distance.

21. A clamping and/or spreading tool according to claim 20, characterized in that said damping means and said prime mover are combined in a single structural unit, in particular in a single component, preferably in a spiral band spring.

22. A clamping and/or spreading tool according to one of the claims 21 to 22, characterized in that said damping means comprises a piston and cylinder arrangement including a damping fluid, wherein in particular said piston of said damping means is coupled to said push or pull rod and in particular said cylinder of the damping means is coupled to said support.

23. A clamping and/or spreading tool according to one of the claims 20 to 21, characterized in that the damping means acts operationally on a rotatory drivable gear member.

24. A clamping and/or spreading tool according to claim 20, characterized in that the damping means generates frictional loss, in particular splashing loss.

25. A clamping and/or spreading tool according to claim 24, characterized in that said damping means comprises a damping liquid in which a damping member adapted to be driven operates.

26. A clamping and/or spreading tool, in particular according to one of the claims 1 to 25, comprising a drive for displacement in a longitudinal direction, the push or pull rod being movably supported on a support of the clamping and/or spreading tool and to which push or pull rod a movable jaw is fixed with respect to said support carrying a stationary jaw, said drive having a drive energy reservoir, characterized in that a mechanism for loading drive energy into said drive energy reservoir independently from the displacement operation of said push or pull rod comprises an actuating means supported to be rotatable by which a torsion spring of said drive is manually chargeable.

27. A clamping and/or spreading tool according to claim 26, characterized by a locking means for preventing release of drive energy, wherein in particular a latch means is provided that prevents the release of rotatory motion of a torsion spring.

28. A clamping and/or spreading tool, in particular according to one of the claims 1 to 27, comprising a drive for displacement of a push or pull rod in a longitudinal direction, the push or pull rod being supported on a support of the clamping and/or spreading tool, to which push or pull rod a movable jaw is fixed with respect to said support carrying a stationary jaw, said drive having a drive energy reservoir and a mechanism for loading drive energy into said reservoir, wherein said mechanism loads drive energy into said reservoir during displacement of said push or pull rod in a closing direction in which, in case of a clamping tool, the movable jaw is to be moved towards the stationary jaw or, in case of a spreading tool, the movable jaw is to be moved away from the stationary jaw, characterized in that said mechanism loads drive energy also in an opening direction opposite to the closing direction.

29. A clamping and/or spreading tool according to the first part of claim 28 or according to one of the claims 1 to 28, characterized in that a mechanism for loading drive energy comprises a gear member adapted to be driven in rotation, which gear member cooperates with the moved push or pull rod so as to be rotatory driven and is coupled with said drive and said storing device formed as a torsion spring so as to load the torsion spring wherein in particular a means for converting the rotatory motion of said gear member in a rotatory motion of said torsion spring is provided.

30. A clamping and/or spreading tool according to claim 29, characterized by a rotation alternation which, upon reversal of the direction of displacement of said push or pull rod, changes the rotatory motion of said gear member in a rotatory motion suitable for said rotation alternation.

31. A clamping and/or spreading tool according to claim 30, characterized in that said rotation alternation is manually operatable or that said rotation alternation is activated when the direction of displacement of the push or pull rod is changed.

32. A clamping and/or spreading tool according to one of the claims 28 to 31, characterized by a blocking of the energy release which is activated during charging and in particular is manually deactivatable.

33. A clamping and/or spreading tool according to claim 32, characterized in that said blocking of energy release is realized as a locking pawl means blocking a rotatory drive motion of the torsion spring.